

CLAIMS

1. A high frequency magnetic thin film comprising:  
a first layer comprising a T-L composition (here, T is Fe or FeCo, L is one or more of C, B and N); and  
a second layer comprising a Co-based amorphous alloy arranged on either of the surfaces of said first layer.
2. A high frequency magnetic thin film according to claim 1, wherein:  
a plurality of said first layers and a plurality of said second layers are laminated to form a multilayer film structure.
3. A high frequency magnetic thin film according to claim 1 or 2, wherein:  
the real part ( $\mu'$ ) of the complex permeability at 1 GHz is 400 or more,  
the quality factor  $Q$  ( $\mu'/\mu''$ ) is 4 or more, and  
the saturation magnetization is 14 kG (1.4 T) or more.
4. A high frequency magnetic thin film according to claim 3, wherein:  
when  $T_1$  denotes the thickness of said first layer and  $T_2$  denotes the thickness of said second layer,  $T_1$  falls within the range from 3 to 70 nm and  $T_1/T_2$  falls within the range from 0.15 to 3.50.

5. A high frequency magnetic thin film according to claim 1 or 2, wherein:

the real part ( $\mu'$ ) of the complex permeability at 1 GHz is 500 or more,

the quality factor  $Q$  ( $\mu'/\mu''$ ) is 10 or more, and

the saturation magnetization is 14 kG (1.4 T) or more.

6. A high frequency magnetic thin film according to claim 5, wherein:

when  $T_1$  denotes the thickness of said first layer and  $T_2$  denotes the thickness of said second layer, the thickness of said first layer  $T_1$  falls within the range from 0.5 to 3.0 nm and  $T_1/T_2$  falls within the range from 0.8 to 3.0.

7. A high frequency magnetic thin film according to any one of claims 1 to 6, wherein:

said second layer is mainly composed of Co, and comprises at least one additional element selected from the group consisting of B, C, Si, Ti, V, Cr, Mn, Fe, Ni, Y, Zr, Nb, Mo, Hf, Ta and W.

8. A high frequency magnetic thin film according to any one of claims 1 to 7, wherein:

said second layer is selected from the group consisting of CoZr, CoHf, CoNb, CoMo, CoZrNb, CoZrTa, CoFeZr, CoFeNb, CoTiNb, CoZrMo, CoFeB, CoZrNbMo, CoZrMoNi, CoFeZrB, CoFeSiB and CoZrCrMo.

9. A high frequency magnetic thin film according to any one of claims 1 to 8, wherein:

the concentration of the element L contained in said first layer falls within the range from 2 to 20 at%.

10. A composite magnetic thin film, comprising:

a first layer which is mainly composed of Fe or FeCo, with the saturation magnetization of 16 kG (1.6 T) or more by itself, and said first layer is constituted with a columnar structure of 1.4 or less aspect ratio or an amorphous structure, and

a second layer which is mainly composed of Co, having the properties by itself that the permeability is 1,000 or more (the measurement frequency: 10 MHz), the saturation magnetization is 10 kG (1.0 T) or more, and the resistivity is 100  $\mu\Omega$  cm or more, wherein:

said first layer and said second layer are alternately laminated.

11. A magnetic device comprising a high frequency magnetic thin film, wherein:

said high frequency magnetic thin film is a multilayer film wherein a first layer comprising a T-L composition (here, T is Fe or FeCo, L is one or more of C, B and N) and a second layer comprising a Co-based amorphous alloy arranged on either of the surfaces of said first layer are alternately laminated.

12. A magnetic device according to claim 11, wherein:  
said magnetic device comprises said high frequency  
magnetic thin films arranged to face each other so as to sandwich  
a coil.

13. A magnetic device according to claim 12, wherein said  
magnetic device is an inductor or a transformer.

14. A magnetic device according to claim 12, wherein:  
said magnetic device is an inductor used in a monolithic  
microwave integrated circuit.